HYDRAULIC MACHINERY.

Modern Pumping and Hydraulic Machinery: Being a Practical Handbook for Engineers, Designers, and Others. By E. Butler, Pp. xvi + 473. (London: C. Griffin and Co., Ltd., 1913.) Price 18*s*. net.

AN examination of this important work brings home to the reader some idea of the enormous extent and ever-increasing variety of machinery that is used in connection with hydraulics; for, although this treatise is devoted to the consideration of the wide range of machinery and appliances connected with almost every known type used in pumping operations, the amount of other classes of hydraulic machinery which the exigencies of space excluded would well fill the pages of another volume. For this reason the subtitle is too comprehensive and rather misleading, as the book does not deal with hydraulic machinery "as applied to all purposes"; but, it is fair to say, the author has wisely restricted its scope to enable him to deal comprehensively with the sections selected, and in a broad way included in the title "pumping machinery." The ground chosen has been covered in an exhaustive and systematic way, and a glance at the contents shows how varied is the machinery dealt with, for it embraces machinery used for water-supply, wells, mines, drainage, irrigation, dredging, reclamation work, and for raising petroleum from deep wells, and a chapter is devoted to hydraulic power wheels and turbines.

There is no lack of admirable books on the theory of hydraulics and of hydraulic machines, but the many important developments and improvements made in hydraulic machinery in recent years have doubtless created a demand for just such a book as Mr. Butler has so ably produced, and the information it contains cannot fail to be of use to the practical engineer and others engaged either in the construction or application of hydraulic machinery, to say nothing of its educational value to the engineering student. The designer will also appreciate the book, as it contains a wealth of detail and descriptive matter, but his requirements as to the proportioning of parts have not received the attention they might with advantage have had given to them here and there in a treatise of this type. No better work than Seaton's "Marine Engineering" can be cited as an example of what can be done in this direction to help the designer. The Humphrey gas-displacement pump, the most important invention in pumping machinery made in recent years, is fully described, and the author gives some particulars of previous inventions of this type, but omits to mention that the first-known internal combustion pump was Tatham's, patented about 1894, and referred to in the discussion on the Humphrey pump at the Institution of Mechanical Engineers.

The illustrations are extremely well reproduced, with few exceptions; for instance, the longitudinal sections on p. 387 look rather too confusing to be easily read, owing to their coarse section lining. On the other hand, the diagram on p. 377, showing development of vane curvature in an impeller wheel, is admirable.

The book is a notable addition to the literature of the subject, and should be well received.

H. J. S.

MIND, HEALTH AND PURPOSE.

(1) *The Game of Mind: A Study in Psychological Disillusionment.* By Percy M. Campbell. Pp. iii + 80. (New York: Baker and Taylor Co., 1913.) Price 75 cents net.

(2) *Mind and Health. With an Examination of some Systems of Divine Healing.* By Dr. E. E. Weaver. With an Introduction by Dr. G. Stanley Hall. Pp. xv + 500. (New York: The Macmillan Company; London: Macmillan & Co., Ltd., 1913.) Price 8*s*. 6*d*. net.

(3) *Development and Purpose: An Essay towards a Philosophy of Evolution.* By Prof. L. T. Hobhouse. Pp. xxix + 383. (London: Macmillan & Co., Ltd., 1913.) Price 10*s*. net.

(1) IN "The Game of Mind" Mr. Campbell puts the question: "To what extent does the mere reiteration, by the possessor of a toothache, of the complaint that he is indeed feeling pain, influence or *constitute* that pain? In other words, If the victim were so organised that he need not perforce tell himself each instant that he is being hurt, would the hurt exist as such at all?" And Mr. Campbell replies: "We are convinced that it would not." Mr. Campbell, of course, discusses many other questions; but his method of argument displays the same degree of cogency throughout.

(2) In "Mind and Health" Mr. Weaver discusses "some of the distinctive religious and philosophical systems of healing," and lays down "the plan of a valid system of healing on religious ground." The first element of "a valid religious psychotherapy" he declares to be that "sickness comes from want of goodness." "Goodness" is, of course, an ambiguous term; and Mr. Weaver very properly describes the sense in which he uses it: "A goodness that starts in the spiritual and will be allowed to work unfettered and unhindered in the intellectual, emotional, and physical life will not be sick. It knows no sickness." If goodness of this kind—a goodness which knows no sickness—is to be pro-

© 1913 Nature Publishing Group

duced in the patient, then it must first be possessed by the practitioner: "The power of healing released through a religious psychotherapy should be mediated by the minister of religion." If so, then, Mr. Weaver argues, the Christian Church must carry on the ministry of religious psychotherapy. Mr. Weaver's fundamental assumption, then, is: Be good (or get someone to make you good) and you won't be ill. It is a defect of his book, however, that he does not convince the reader of the truth of the assumption.

(3) Mr. Hobhouse's "Development and Purpose" is a contribution to philosophy, serious, solid, and certainly heavy. "The book completes a scheme which has occupied the writer for twenty-six years, and has been carried through successive stages in three previous works." But the scheme has come to be completed in a way which a quarter of a century ago Mr. Hobhouse did not foresee or intend. He has come to hold that in the process of evolution both mechanical causation and teleological causation are at work; and, what is more, that mechanical causation involves teleological causation—hence, according to Mr. Hobhouse, the "organic harmony" of the world process.

Intelligent action is truly purposive, that is to say it is teleological causation and is not resolvable into mechanical laws. The actual order of reality, he tells us, is determined by the impulse to realise the future: what we do now is determined by what we want to be or do in the future. But, if that is so, it seems to the reader as though no place were left for mechanical causation, no need for causes prior in time to their effects. Mr. Hobhouse, however, holds that mechanical causation involves teleological causation, *i.e.* apparently that there could be no cause prior in time to the effects unless there were causes which, being teleological, are not prior in time to their effects. From this it would seem that the source of the trouble lies in the assumption that causes must be in time; on that assumption causes must both be and not be prior in time to their effects.

Mr. Hobhouse, though he sees and says that in the more ultimate sense Reality is not in time, but time is in Reality, does not devote more than this single sentence to the way in which, as it seems to us, the notion of time refracts causation into mechanical and teleological causes. However, Mr. Hobhouse's services to the cause of philosophy are recognised by all interested in philosophy; and all will be glad that the University of Durham has, in recognition of those services, conferred upon him the honorary degree of D.Litt.

IRON AND STEEL METALLURGY.

(1) *Iron Making in Alabama.* Third Edition. By W. B. Phillips. Pp. 254+xxxi plates. (Alabama: The University, 1912.)

(2) *Iron and Steel: An Introductory Text-book for Engineers and Metallurgists.* By O. F. Hudson and Dr. G. D. Bengough. Pp. x+173. (London: Constable and Co., Ltd. 1913.) Price 6*s.* net.

IT would be difficult to find a better illustration of the wide range of subjects involved in the study of iron and steel than these two books. Whereas one deals mainly with the extraction of iron from its ores, the other is largely concerned with the properties of the recovered metal, and the subjects range from the mining of the ore and the washing of coal on the one hand, to the constitution of steel and the electrolytic theory of corrosion on the other.

(1) The book by Mr. Phillips is published by the Geological Survey of Alabama, and is of necessity somewhat statistical. It is seldom, however, that one finds statistics dealt with in such an interesting manner. The title of the book might more accurately and with advantage be described as "Iron and Steel Making in Alabama," for it includes an excellent account of the steel-works of the State, which are responsible for an annual output of nearly half a million tons of steel in all sections, from rails to wire.

The first part of the book deals exhaustively with the iron ores of Alabama, and a chapter is devoted to experimental work on concentration. Fluxes and fuels are then considered, and much useful information is given on coking practice and the employment of by-product coke ovens. Blast-furnace practice, as regards both coke and charcoal furnaces, is considered in detail, and the growth and development of the modern blast-furnace is traced from the year 1894 to 1910. This is followed by an excellent account of the steel-works and rolling-mills of the State, and finally there is a chapter on coal-washing. Not the least useful feature of the book is the large number of tables of statistics, and some reference must be made to the excellent series of illustrations, thirty in number, which are reproduced from photographs.

The extent of the iron and steel industry in Alabama may be gauged from the fact that in the year 1910 nearly five million tons of ore were mined and sixteen million tons of coal, of which five million tons were converted into coke. The production of pig-iron amounted to two million tons, and of steel half a million tons. Such an industry is of more than local importance, and

© 1913 Nature Publishing Group